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Claims

[c1] 1. A coarsening resistant automotive exhaust catalyst composition comprising:
a metal or metal-containing compound that alters the amount of a chemical component in the automobile exhaust; and
a component having metal ions bonded to a conjugate base oxide of an inorganic acid, the inorganic acid having a Ka such that the automotive catalyst composition resists phase transitions that reduce surface area and the metal ions being selected from the group consisting of alkali metal ions, alkaline-earth metal ions, and combinations thereof.

[c2] 2. The automotive exhaust catalyst composition of claim 1 wherein the Ka is from about 5.0×10^{-7} to about 1.0.

[c3] 3. The automotive exhaust catalyst composition of claim 1 wherein the Ka is from about 5.0×10^{-5} to about 1.0×10^{-1}.

[c4] 4. The automotive exhaust catalyst composition of claim 1 wherein the alkali or alkaline-earth containing compound includes an atom selected from the group con-

sisting of Ba, Li, Na, K, Cs, Mg, Ca, Sr, and combinations thereof.

[c5] 5. The automotive exhaust catalyst composition of claim 1 wherein the conjugate base oxide is the conjugate base of an acid selected from the group consisting of H_3PO_4, H_2TiO_3, $HMnO_4$, $HTaO_3$, $HNbO_3$, H_2ZrO_3, $HOsO_4$, $HReO_4$, and combinations thereof.

[c6] 6. The automotive exhaust catalyst composition of claim 1 wherein the component having metal ions bonded to a conjugate base oxide of an inorganic acid is present in an amount from about 0.3 weight percent to about 50 weight percent of the total weight of the exhaust catalyst composition.

[c7] 7. The automotive exhaust catalyst composition of claim 1 wherein the component having metal ions bonded to a conjugate base oxide of an inorganic acid is present in an amount from about 1 weight percent to about 20 weight percent of the total weight of the exhaust catalyst composition.

[c8] 8. The automotive exhaust catalyst composition of claim 1 wherein the conjugated base oxides are milled or grounded into fine particles suitable for washcoating on substrates.

[c9] 9. The automotive exhaust catalyst composition of claim 1 wherein the conjugate base oxide are nanoparticles.

[c10] 10. The automotive exhaust catalyst composition of claim 1 further comprising a catalyst support.

[c11] 11. The automotive exhaust catalyst composition of claim 1 wherein the conjugate base oxides are deposited onto or impregnated in the catalyst support.

[c12] 12. The automotive exhaust catalyst composition of claim 10 wherein the catalyst support is selected from the group consisting of Al_2O_3, SiO_2, TiO_2, zeolites, and combinations thereof.

[c13] 13. The automotive exhaust catalyst composition of claim 10 wherein the conjugated base oxides are SAPO molecular sieves or sol-gel process derived supports.

[c14] 14. The automotive exhaust catalyst composition of claim 1 wherein the precious metal is selected from the group consisting of platinum, palladium, and rhodium.

[c15] 15. The automotive exhaust catalyst composition of claim 14 wherein the precious metal is platinum.

[c16] 16. The automotive exhaust catalyst composition of claim 1 further comprising a Ce-containing oxides.

[c17] 17. The automotive exhaust catalyst composition of claim 16 wherein the Ce-containing oxide is a mixed oxide selected from the group consisting of Ce/Zr oxide, Ce/Pr oxide, Ce/Pr/Zr oxide, and combinations thereof.

[c18] 18. A NOx trap comprising:
a substrate;
a catalyst composition coated upon the substrate, the catalyst composition comprising;
a precious metal-containing compound;
a component having barium metal ions bonded to a conjugate base oxide of an inorganic acid, the inorganic acid having a Ka such that the automotive catalyst composition resists phase transitions that reduce surface area.

[c19] 19. The NOx trap of claim 18 wherein the Ka is from about 5.0×10^{-7} to about 1.

[c20] 20. The NOx trap of claim 18 wherein the Ka is from about 5.0×10^{-5} to about 1.0×10^{-1}.

[c21] 21. The NOx trap of claim 18 wherein the conjugate base oxides are derived from acids selected from the group consisting of H_3PO_4, H_2TiO_3, $HMnO_4$, $HTaO_3$, $HNbO_3$, H_2ZrO_3, $HOsO_4$, $HReO_4$, and combinations thereof.

[c22] 22. The NOx trap of claim 18 wherein the catalyst com-

position further comprises a catalyst support.

[c23] 23. The NOx trap claim 23 wherein the catalyst support is selected from the group consisting of Al_2O_3, SiO_2, TiO_2, zeolites, SAPO molecular sieves, sol-gel process derived supports, and combinations thereof.

[c24] 24. A method of inhibiting coarsening in an automobile exhaust catalyst composition having an alkali or alkaline-earth metal containing compound, the method comprising:
combining a metal or metal-containing compound with a component having alkali or alkaline-earth metal ions bonded to a conjugate base oxide of an inorganic acid, the inorganic acid having a Ka such that the automotive catalyst composition resists phase transitions that reduce surface area.

[c25] 25. The method of claim 24 wherein the Ka is from about 5.0×10^{-7} to about 1.

[c26] 26. The method of claim 24 wherein the alkali or alkaline-earth metal ions are selected from the group consisting of ions from Ba, Li, Na, K, Cs, Mg, Ca, Sr, and combinations thereof.

[c27] 27. The method of claim 24 wherein the conjugate base oxides are derived from acids selected from the group

consisting of H_3PO_4, H_2TiO_3, $HMnO_4$, $HTaO_3$, $HNbO_3$, H_2ZrO_3, $HOsO_4$, $HReO_4$, and combinations thereof.